

## Supplement Material

### **Enhancing Carrier Lifetime in SrTiO<sub>3</sub> via Metallic Doping: Insights from First-principles calculations and Non-adiabatic Molecular Dynamics**

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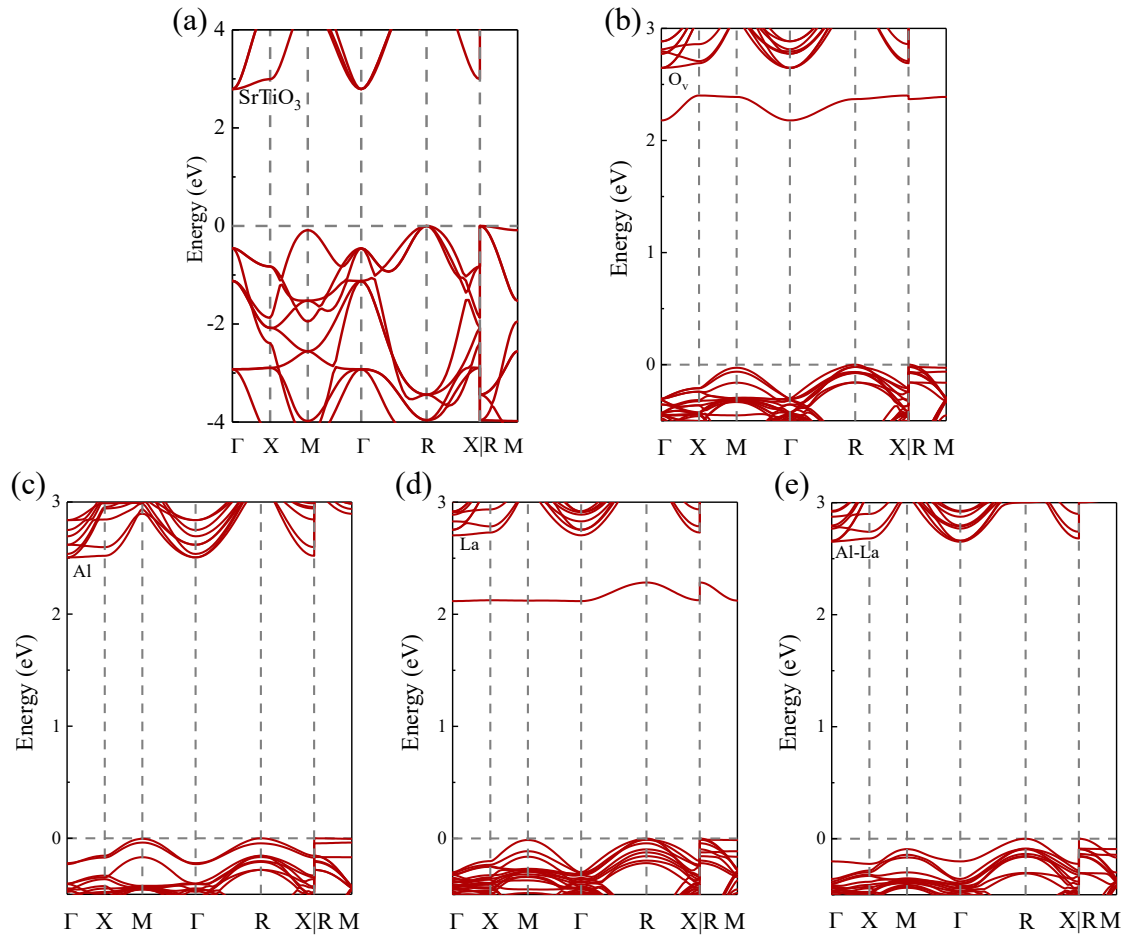


Figure S1. The band structures of (a) pristine, (b) O<sub>v</sub>, (c) Al-doped, (d) La-doped, and (e) Al-La co-doped SrTiO<sub>3</sub>.

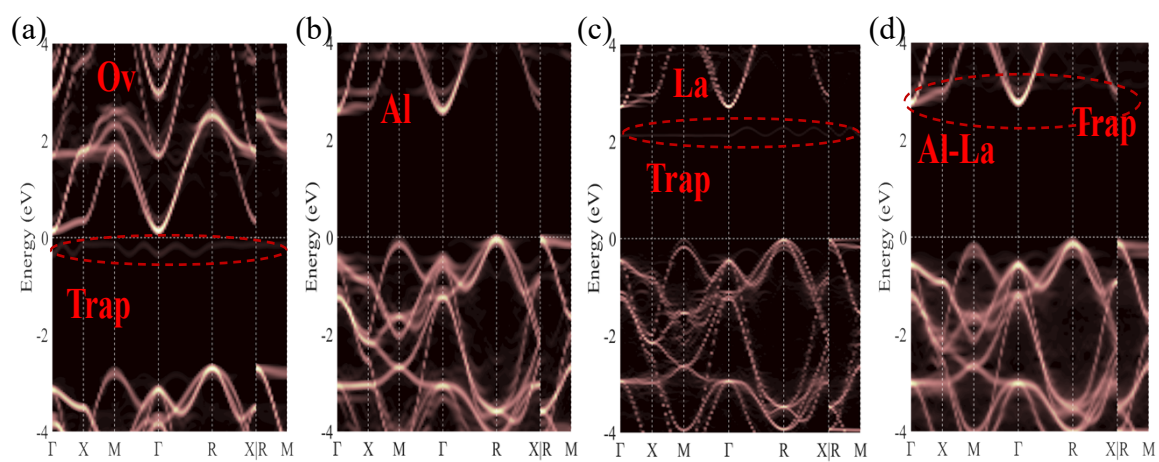


Figure S2. The unfolded band structures of the (a)  $O_v$ , (b) Al-doped, (c) La-doped, and (d) Al-La co-doped system.